

REMARKS

Favorable consideration and allowance are respectfully requested for claims 1, 2, 4, and 23-26 in view of the following remarks. Rejoinder of the withdrawn claims is respectfully requested, to the extent applicable.

Claims 1 2, 4, and 23-26 and 23 are amended to improve their general syntax. Claims 1 and 23 are also amended to recite that the sol-gel raw material used to produce the gel body includes at least one kind of a silicon alkoxide containing a phenyl group. Support for this change may be found in the specification, at least on page 8, line 21 to page 9, line 2; and page 9, lines 21-23, as well as Example 4-1 on page 42, line 14 of the specification.

Claim 2 is amended to further characterize the gel body. Support for this amendment may be found in the specification, at least at page 9, line 26 to page 10, line 6. Claim 24 is amended to recite that R is a phenyl group and claim 25 is amended to recite that R is a methyl or ethyl group. Support for these changes is provided in the specification, at least on page 15, line 27 to page 16, lines 5-12; page 10, lines 14-24, and page 42, lines 19-21.

The rejection of claims 1, 2 and 4 as obvious over Kawabe et al., US 2003/0005723 and Etienne, WO 02/057810 (represented by US 7,006,745) and the rejection of claims 23-26 as obvious over Kawabe et al. and Etienne, further in view of Kuriyama (abstract of JP 07-126035), Yamada (abstract of JP 02-137737) and Niida et al., *J. Non-Crystalline Solids*, 306:292-99 (2002) are respectfully traversed. In particular, the proposed combinations of references do not teach a step of producing a gel body from a raw material, as is presently claimed, where at least one kind of a silicon alkoxide containing a phenyl group is used as a sol-gel raw material.

Paragraphs 1 and 2 of the recent Office Action assert that Kawabe et al. teaches "a process for manufacturing an organic inorganic hybrid glassy material comprising producing a gel body by the sol-gel method ([0037], [0043], [0062] comprising a metal unit and a phenyl group [0039], [0042])". However,

paragraphs [0039] and [0042] of Kawabe et al. appear to have nothing to do with a phenyl group. Although "tetraethoxysilane" is disclosed, for example, in paragraph [0134] of Kawabe et al., and "tetraethoxysilane and methyltriethoxy silane" are disclosed, for example, in paragraph [0182] of Kawabe et al., these silane compounds are substantially different from the "at least one kind of a silicon alkoxide containing a phenyl group" as is presently claimed.

When water is present (see line 2 of [0134] of Kawabe et al.), the tetraethoxysilane ($\text{Si}(\text{OC}_2\text{H}_5)_4$) is converted into silica (SiO_2) through hydrolysis and polycondensation. In fact, silanol groups Si-OH are formed by the hydrolysis, as shown in the following reaction:



where R is an ethyl group in the case of tetraethoxysilane. Silanol groups Si-OH are highly reactive. When these reactive silanol groups get near one another, polycondensation occurs instantaneously to form a network of $-\text{Si-O-Si-O-Si}-$ (note that in fact each silicon atom has four bonding arms and therefore is bound to four oxygen atoms) with the release of water (H_2O). The formation of this network also results the formation of silica (SiO_2). Once silica (SiO_2) is formed, the gel body does not melt under low temperature (e.g., 70°C). Under low temperature, the gel body of SiO_2 is simply dried as a result of evaporation of the remaining solvent.

In contrast, according to the present claims 1 and 23, a silicon alkoxide containing phenyl group (e.g., phenyltriethoxysilane ($\text{PhSi}(\text{OEt})_3$) where Ph is a phenyl group and Et is ethyl group, is used as a sol-gel raw material. This silicon alkoxide containing phenyl group is hydrolyzed to produce silanol groups (Si-OH), **but the silanol groups cannot get near one another due to steric hindrance by the phenyl group**. As a result of the presence of these silanol groups in the gel body, SiO_2 is not perfectly formed. Thus, the molecules of the gel body can move relatively freely within the gel body. As a result, when the gel body is heated, the gel body melts. This melting of the gel body, rather than the gel body simply drying, is a surprising and unexpected result. Further, the

resulting organic-inorganic hybrid glassy material has a variety of special beneficial properties, as detailed on page 7, lines 12-30 of the present specification.

Thus, not only is there a difference in the physical structure of the materials used in the claimed processes, but that difference in physical structure has a significant impact on the product produced by the process. As such, the claimed process is not obvious.

None of the other references make up for the failure of Kawabe to teach or suggest producing a gel body as is presently claimed. Accordingly, the proposed combinations of references fail to teach or suggest the present claims and reconsideration and withdrawal of these rejections are respectfully requested.

CONCLUSION

In view of the foregoing, reconsideration and withdrawal of the rejection are therefore requested.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket No. 038788.53357US).

Respectfully submitted,

November 2, 2007

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